Effect of temperature on the development of Godronia cassandrae f. vaccinii cankers on lowbush blueberry]

C. L. Lockhart

Lesion development on lowbush blueberry *(Vaccinium angustifolium)* artificially inoculated with *Godronia cassandrae* f. *vaccinii* was greater on plants grown at 15°C days and 4.5°C nights than on those grown at 21°C days and 9.5°C nights. Inactive lesions on plants from 21°C days and 9.5°C nights became active when the plants were exposed to cool autumn temperatures in an unheated greenhouse.

Can.** Plant **Dis. Surv. 55:29-30. 1975.

Le developpernent des lesions sur le bleuet nain *(Vaccinium angustifolium)* artificiellement inoculé avec *Godronia cassandrae* f. *vaccinii* a ete plus considerable chez les plants cultives a des temperatures diurnes et nocturnes de 15 et de 4.5°C respectivement que chez cultives a des temperatures diurnes et nocturnes de 21 et de 9.5°C. Jusque-la latentes, les lesions des plants exposes aux temperatures diurnes et nocturnes de 21 et de 9.5°C respectivement sont devenues actives lorsque les plants ont ete a aux temperatures fraiches d'automne en serre non chauffee.

In a previous study (1) *Godronia cassandrae* (Peck) f. *vaccinii* Groves (stat. conid. *Fusicoccum putrefaciens* Shear) was found to infect highbush blueberries (*Vaccinium corymbosum* L.) in the spring and in the autumn but not during the active growth period in the warm summer temperatures. This study reports on the effect of two temperature regimes on the development of G. *cassandrae* f. *vaccinii* cankers on the lowbush blueberry *(Vaccinium angustifolium* Ait.).

Inoculation experiments

An isolate of *G. cassandrae* f. *vaccinii* from lowbush blueberry (2) was used to inoculate actively growing 2-year-old lowbush blueberry seedlings by the wound incision method previously described (2). Forty plants were inoculated with the fungus and eight plants not inoculated served as controls. The plants were divided into two lots, placed in growth chambers (Controlled Environment Ltd., EY8VH) equipped with six 40-W fluorescent bulbs and eight 100-W incandescent bulbs and grown under the following regimes for 6 to 8 months:

1. 15°C days (16 h) and 4.5°C nights (8 h)
2. 21°C days (16 h) and 9.5°C nights (8 h)

Relative humidity was 92% during the day and 98% at night. The experiment was repeated three times. Data were analyzed using the 't' test.

After 6 to 8 months cankers on the lowbush blueberries artificially inoculated with *G. cassandrae* f. *vaccinii* averaged 7.9 mm long in 15°C day and 4.5°C night regime and 5.0 mm long in the 21°C day and 9.5°C night regime (Table 1). The low temperature regime favored a higher rate of successful inoculations (Table 2). At the higher temperatures the lesions had considerable callus tissue and appeared to be inactive, but many became active after the plants were transferred to an unheated greenhouse where cool autumn temperatures prevailed. There were no signs of fungal fruiting structures on any of the cankers.

The effect of temperature on the growth of the fungus in vitro was determined on potato dextrose agar plates incubated at 11 different temperatures ranging from 0°C to 28°C and replicated four times. After 21 days the diameters of the colonies were measured. The fungus grew at temperatures from 0°C to 28°C with maximum growth at 14°C to 22°C (Fig. 1). By coincidence the temperature regimes selected for inoculation

Table 1. Length of lesions on lowbush blueberry stems 6 to 8 months after inoculation with *G. cassandrae* f. *vaccinii*

	Length of lesions (mm)			
Temperature regime	Test 1 (6 months)	Test 2 (8 months)	Test 3 (6 months)	Avg.
4.5° and 15° C	7.4	9.8	6.6	7.9
9.5' and 21' C	5.4	5.0**	4.6**	5.0

**Significant at P = 0.01

Table 2. Percentage of G. *cassandrae* f. *vaccinii* inoculations producing lesions

Temperature regime	Test 1	Test 2	Test 3	Avg
4,5° and 15°C	60	100	95	85
9.5° and 21°C	80	90	20	63

[1] *Contribution No. **1546,** Research Station. Agriculture Canada, Kentville, Nova Scotia.*

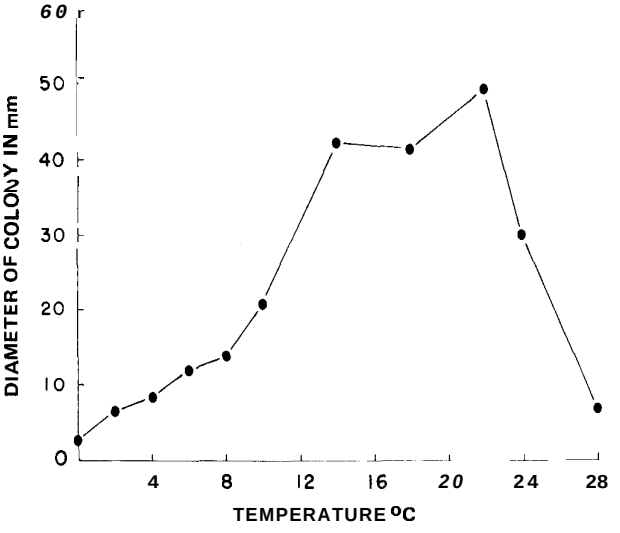

Figure 1. Influence of temperature on growth of ***Godronia cassandrae*** f. ***vaccinii.***

experiments fall within the optimum growth range of the fungus in vitro but there was significantly less canker development at the higher temperature regime (Table 1). This indicated that growth and development of the fungus in vitro and in vivo may fall off sharply as indicated by the growth behavior of the fungus above 22°C (Fig. 1).

The slow development of G. ***cassandrae*** f. ***vaccinii*** on the lowbush compared to the highbush blueberry may explain the difference in the severity of the disease on the two types of blueberries. On highbush blueberry G. ***cassandrae*** f. ***vaccinii*** can completely girdle a stem in one season (3) but this has not been observed in these experiments or on 2-year-old shoots of lowbush blueberry plants in the field (2). The practice of burning lowbush blueberry fields every 2 or 3 years apparently destroys infected stems before the fungus becomes established in the basal area of the shoots. Consequently the canker is found mainly on plants in neglected lowbush blueberry fields.

Acknowledgment

The author is indebted to G. L. Moody for technical assistance

Literature cited

1. Lockhart, C. L., and D. L. Craig. 1967 Fusicoccum canker of highbush blueberry in Nova Scotia. Can. Plant Dis. Surv. 47:17-20.
2. Lockhart, C. L., and R. W. Delbridge. 1972. Occurrence and pathogenicity of Godronia cassandrae f. vaccinii on lowbush blueberry in Nova Scotia. Can. Plant Dis. Surv. 52:119-121.
3. Creelman, D. W. 1958. Fusicoccum canker on the highbush blueberry especially with reference to its occurence in Nova Scotia. Plant Dis. Rep. 42:843-845.